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THE NATIONAL TOOL AND DIE JOURNAL

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Special Tool, Die & Machine Shop Industry

MAY
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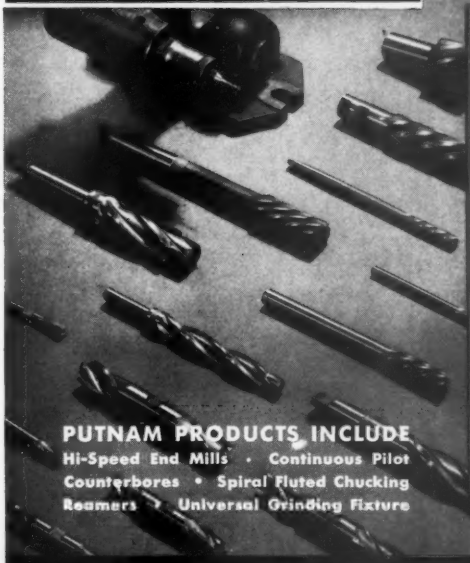

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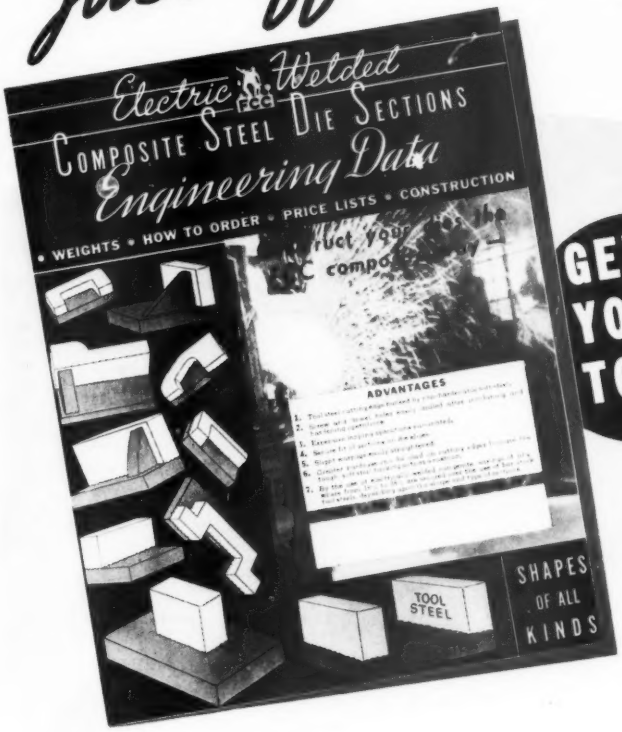

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TOOL·DIE·MACHINE PROGRESS

The National Tool and Die Journal

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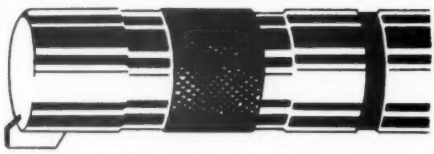

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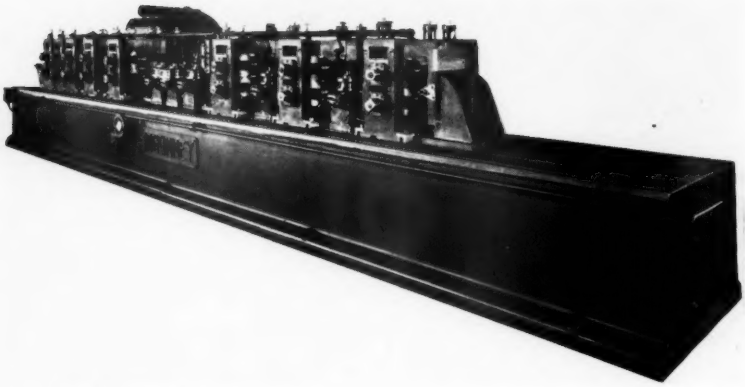

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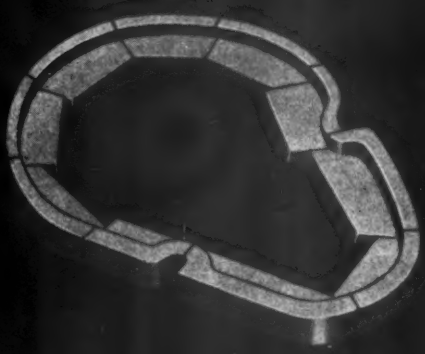

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Tool • Die • Machine **PROGRESS**

The National Tool and Die Journal

May, 1939 Vol. 5, No. 2

AN EDITORIAL

"Machine Tools and You"

WE have before us Howard W. Dunbar's address recently delivered to the Army Industrial College at Washington, D. C. It is a carefully developed paper on the importance of the machine tool, "the only device which reproduces itself." Mr. Dunbar is vice president and general manager of the Grinding Machinery Division of The Norton Company and a former president of The National Machine Tool Builders' Association and his authoritative statement is effectively presented in booklet form by the Association.

Defining the machine tool as the "master tool of industry," Mr. Dunbar says: "Without it our standard of living would approximate that of 1840." Without its development of the present-day degree of accuracy and precision production a $600.00 automobile would still cost $3,500.00, a $100.00 typewriter, $1000.00 and the $1.00 alarm clock, $25.00. Hundreds of products have thus become available at prices which enable millions to buy them and there can be no doubt but that millions are likewise employed who could not be if we were still using the production methods of 50 years ago.

To tell the man who designs and builds tools, dies, jigs, fixtures, molds, gages, special machines and all types of precision specialties and parts that the machine tool is indispensable to him is almost like repeating to him that he must breathe to live. Every tool he builds requires one or more of the operations which Mr. Dunbar designates as the Five Basic Parts—milling, planing, turning, boring, grinding. Thus the tool room and the die shop are dependent upon the machine tool builder but what is also important is the alliance between these two groups in their joint effort to provide the production manufacturer with the utmost in efficient equipment. Thousands of special tools, jigs, fixtures and gages are designed and built every year in contract tool and die shops and in tool rooms to be used on and with these machine tools to perfect production operations. Many special machines also are required to be designed and built each year because standard machine tools cannot be expected to cover every production requirement.

The machine tool is unquestionably the "master tool of industry." Tool rooms, die shops, production plants are alike dependent upon it. In none of them is precision technique more important than in the tool room and the die shop and this present-day precision is best attained on truly modern equipment. It is the ease with which this modern tool room and die shop equipment attains dimensional accuracy along with its higher machine speeds and feeds that assures the lowering of special tooling costs in production industry tool rooms and the realization of profits in contract TDM shops.

GEORGE J. HUEBNER, Editor

Copies of Mr. Dunbar's booklet, "Machine Tools and You," are available on request. Write the publication office of TDM PROGRESS.

A Press Die for Dry Process Porcelain Molding

By E. W. Eckert
Works Engineer
Porcelain Division
Westinghouse Elec. & Mfg. Co.
Derry, Pa.

The porcelain piece whose 75 individual dimensions, abrasive action on die parts and uneven shrinkage called for ingenuity in die design has just been removed from the mold.

AN unusually interesting use of a press die in producing dry-process electrical porcelain pieces of intricate design is reported from the porcelain factory of Westinghouse Electric & Manufacturing Company at Derry, Pennsylvania.

The porcelain pieces, with some 75 individual dimensions, had to be held to rigid tolerances to fit 30 metal parts and the enclosing assembly. As ordinary tool steel does not have suitable qualities to resist the abrasive action of the porcelain clay, a high carbon, high chromium steel was found which, after considerable investigation, was satisfactory.

The die itself was made from a solid block. It was designed to withstand 200 pounds per square inch pressure. Considerable study had to be given the design to permit the clay to flow freely. Particular care was necessary at points where uneven sections, a thick section adjacent to a thin section, occurred to provide sufficient shrinkage on the lighter sections over the heavier sections, so that after firing there would be a uniformity in dimensions. An idea of this difficulty is obtained when it is understood that the average shrinkage of this type of material is 12½ per cent from the pressing operation to the fired piece. On the heavier sections, the 12½ per cent would be standard shrinkage, while some of the lighter sections required a different percentage of shrinkage, depending upon their relation, or location, with an adjoining heavier section. On the sections where the greatest flow of material occurs there is a maximum of wear on the die parts. To keep to specified tolerances inserts which were easily replaced were used.

The illustration shows the hand operated press, the open die and one of the porcelain pieces as it came from the die.

After molding, the raw porcelain is dried just enough to make the surface tough preliminary to sponging and smoothing. Then the pieces are dried until all free moisture is eliminated after which they are kiln-fired at precision-controlled temperatures.

The clay must be prepared as carefully as the die itself, not only for the shrinkage control but to minimize porosity and give maximum ultimate strength to the finished pieces.

Die Designing and Estimating

Advanced Series

V

By GEORGE DANNES

George Dannes is superintendent and engineer of the Raffel Manufacturing Company of Chicago, and instructor in the advanced class studying Die Designing and Estimating at the Carl Schurz High School under the auspices of the Chicago District of the Special Tool, Die and Machine Shop Institute.

In the March issue Mr. Dannes set up the estimating of die making and accessory operations into six groups. The first, A, or machining group, was covered in the March installment and the second and third groups, B—Estimating Time for Drilling, Reaming, Tapping, etc., and C—Estimating Time for Layout and Inspection, were covered in the April installment. The present installment covers D or Estimating Time for Work on Die. THE EDITOR

ESTIMATING TIME FOR WORK ON DIE GROUP D

THIS column is probably the most important one in our whole estimating setup. The time values for most of the important work done during the construction of the die are recorded in this column. Therefore, a mere understanding only of the tables which are illustrated in this chapter is not sufficient. There should be actual experience in die making and then, as pointed out previously, the ability to visualize machine and hand work will enable the estimator to intelligently apply the method. In the last chapter it was demonstrated how any product part can be broken up into prescribed units of form and these units utilized to determine the time consumed for doing much of the work on the die and its associated parts. Thus, to determine the time required to make an opening of a given shape and perimeter in a die block of a given thickness, we establish the number of form units of which the opening consists and translate the units into time factors. This unit system should be applied not only to the die opening but should likewise include all associated parts. The practical application of such a method naturally depends to a considerable extent on the machine equipment of the individual tool room or die shop and its personnel. It should be emphasized again, that the time values presented in the tables in this chapter as heretofore are based upon procedure in an average die shop or tool room with average equipment and workers of average skill. These values represent not only the actual machine or hand operations, but include also such time losses as are usually encountered. These have been discussed in previous chapters.

Before we go any further with this

chapter, let us see just how practical our method of estimating really is. Fig. 13 illustrates three different product parts.

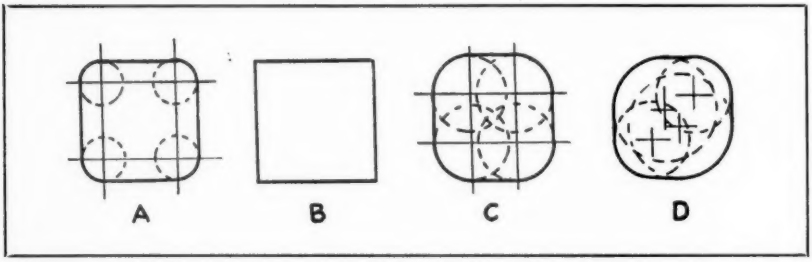

Fig. 13

A—the part we are using for our estimate; B—the same part with the square corners, and C—the same part with corner radii of ⅜".

In terms of time units Fig. 13A has 4 straight lines and 4 corner radii under ¼". According to the table, Fig. 9, (page 18, April issue) each straight line is one time unit but radii measuring less than ¼" are not considered. Thus, the total for A is 4 units.

B, according to the table, has 4 units because it consists entirely of straight lines.

C has not only 4 straight lines in the contour of the part itself but 4 additional straight lines which are used for laying out the location of the corner radii. In this instance these are larger than ¼" and are included at the rate of one unit each. The total is therefore 8 units.

When radii are not located on the same center line as illustrated in D, each radius qualifies as 2 time units. The total for D thus is 12 units—4 for straight lines, 8 for the 4 radii measuring over ¼" whose centers are not located on the same straight lines.

Units Cover Work Time Variables

Now let us see how in actually making the die these units determine the time required to machine and finish the die opening, the punch and other associated parts. Using A of Fig. 13 as an example, we have a die opening, the 4 corners of which can be easily drilled and finished to size, the core removed and finished by any conventional method. The punch for this die opening can also be easily machined and ground with the exception of the corner radii which, being outside radii, require more time for fitting into the die.

A comparison of A, a 4 unit job, with B, also a 4 unit job, reveals some interesting facts. B has an opening with sharp corners. The core is removed and the opening brought to size and finished by practically the same method as is the opening in A with the exception that the corners may present some comparative difficulties. Such an opening unquestionably requires more time for machining than does one with round corners. To offset this, however, the punch for B presents no difficulties at all because it can be machined and ground to size in one setup on the milling machine and grinder. It is obvious therefore that the time required on the punch for B is less than for A and experience with many similar jobs has proven that the total time required for machining a punch and die for each will add up to practically the same amount. It comes down to this: In A, less time is spent on the die opening and more on the punch; in B, vice versa.

In C of Fig. 13 in which the corner radii measure more than ¼" the perimeter cannot be as easily finished as in A. Two, three or more drilling operations or even lathe, boring mill or jig boring setups may be necessary. The punch for such an opening also requires considerably more time for machining and grinding than Fig. A, it being plainly evident that the larger the corner radii are the more difficulty they present. Time consumed for fitting into the die opening is also usually greater. Even when shearing the punch in the hardened die, as is generally the practice, the difficulty of

DIE BLOCK THICKNESS — SIZE →		.5"			1"			2"			4"			8"			12"			16"		
	UNITS →	4	8	12	16	4	8	12	16	4	8	12	16	4	8	12	16	4	8	12	16	4	8	12	16
½		5	6	11		3	4	6	12	3	3	5	10	3	4	7	9	4	6	8	10	4	8	10	12
¾		7				3	5	10	15	3	4	7	11	3	5	7	9	4	6	8	11	5	8	9	11
1						4	6	12		4	5	10	14	4	6	8	11	5	8	10	12	6	9	11	15
1¼						5				5	7	12	17	5	9	10	14	6	9	12	16	7	11	14	17
1½						6				6	9	15	22	6	10	12	16	6	11	15	19	9	12	17	21
TIME IN HOURS																									

Fig. 14

MACHINE OPERATIONS

ALL DIE PARTS	A	B	C	D	E	F
DIE	.6 .8	.7	.4	4.0		
PUNCH	.3 .5					
PUNCH PLATE	.4 .3	.7				
STRIPPER	.4 .3	.7				
DIE SHOE		.7				
PUNCH HOLDER		.7				
STOP						
INSPECTION			1.9			
TRYOUT						
TOTAL	3.6	3.5	2.3			

Data of Group A from March, of Group B and C from April Issues.

ESTIMATING SHEET
Fig. 5

machining the outside radii on the punch increases in proportion to the increase in size of the radius itself.

With all of this explained in such detail, the reason for the total of 12 time units for Fig. D should be readily understood. It should be self evident that the location of the radii and their different dimensions make it necessary to consume that additional time on both die and punch as compared with A, B and C.

It probably has occurred to the reader by this time that another factor which has much to do with determining the time necessary for making a die opening and the die parts is the size of such an opening in the die and its associated parts as well as of the periphery of the punch. While it is obvious that a large opening will require more time than the small one and a large punch more than a small one, this statement must be qualified when openings become so small as to be difficult to machine. Then the rule of size and time does not apply.

Fig. 14 is a table of die block dimensions and correlated time units which has been worked out with these facts duly considered. The time values are in

(Continued on Page 28)

*The Vacuum Process of Aluminum Bronze Die Casting**

By Julius M. Lonn
Production Engineer, Aurora Metal Company

THE production of Aluminum Bronze Die Castings in steel dies has a very definite advantage where intricate shapes are involved. Castings can be held to very close limits and uniform size for even very large volume production and they are produced with a much smoother and more uniform surface than by other methods, such as sand casting.

The range of work covers castings weighing from less than an ounce and produced in quantities of several millions per year, to castings weighing more than 30 pounds each. Such items as pump impellers, lock parts, machinery parts, small automotive assemblies, dairy equipment and industrial hose connections are among the thousands of items we produce each year.

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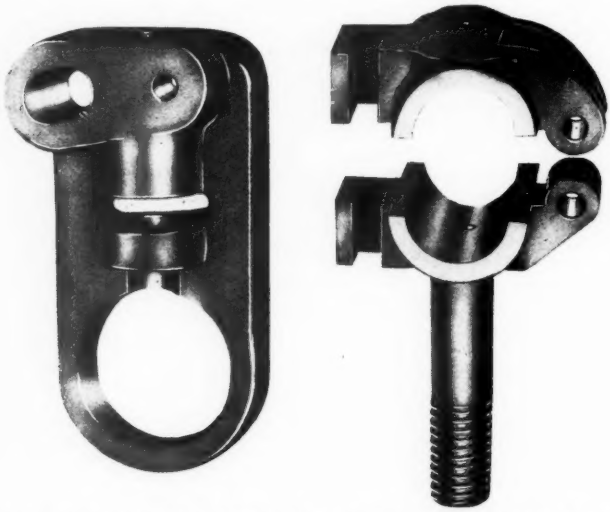
(Continued on Page 30)



A cover and bushing holder (left) and a bearing holder for a printing press inking device. Aluminum bronze die cast design gave economy in finishing labor, resistance to wear and greater strength.

**A patented process of the Aurora Metal Company, Aurora, Illinois.*

The Place of the Turret Lathe in the Tool Room

By C. S. Stilwell
Executive Vice President
The Warner & Swasey Co.

THE installation of the modern turret lathe is considered by many tool rooms as a forward-looking modernizing step because of the flexibility of this machine for the type of tool room work which may consist of a few pieces or even a single piece of work. In addition a number of contract shops are finding that the adaptability of this machine for doing precision semi-production or production work is broadening the scope of work that they are able to do. When the wide range of work for which the new turret lathes are capable is carefully studied, it is clear that in terms of hours of potential and probable use in the average progressive tool room or contract shop, the turret lathe is sound economy.

The place of the turret lathe in production work has been developed over the past decades and is quite clearly understood by industry in general. When it comes to tool room work, however, there is not such a unanimous opinion. For example, it is said that a turret lathe is not easy enough to set up, and it is not flexible enough for average tool room work.

This might have been true some time ago but later developments have changed the situation greatly. As a result of this change, it is desirable that the progressive tool room head be particularly alert to determine if present methods are the best.

The use of the turret lathe in tool rooms and tool shops has been increasing until at present turret lathes can be considered necessary equipment in any well run tool and die shop. This does not necessarily mean that engine lathes are not needed in the tool room, but that the turret lathe has proven its value on a large percentage of tool room work.

Turrets do more small lot work

The turret lathe was originally thought of as a high production machine. Continual improvements that became available have made it possible to use it for short run work, as well as large lots. This trend has continued until turret lathes are now chiefly used for medium and small lot work. A recent study made by the Warner & Swasey Company indicated that 29½ per cent of all its lathes in use were being used to machine less than fifteen pieces per run.

The reason for this increased use is because the turret lathe as now offered is a very flexible machine. It is now available with such attachments as lead screws, selective change gear boxes, cross sliding turrets, power and hand feed compounds and taper attachments. Thus, the turret lathe now has flexibility while retaining the inherent advantages of the turret lathe principle. Figure 1 illustrates a modern turret lathe equipped with a lead screw, a model which has become a popular tool room machine.

Many times tool work consists of

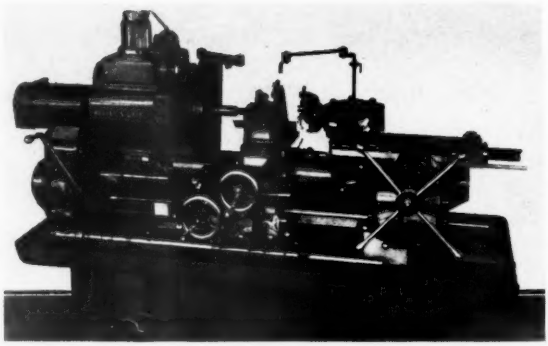


Fig. 1. *This No. 5 Warner & Swasey Turret Lathe, a popular tool room model, is equipped with a full universal cross slide carriage, hex turret saddle unit, lead screw and the new Preselector, a clutch operated device for selecting work speeds in terms of surface feet per minute.*

making more than one piece. Often two and sometimes up to ten or more pieces must be turned out. The great advantage of the turret lathe for this work is that after the first piece is produced, subsequent parts can be made with no tool setting and in a very short period of time.

Turret Holds Up to Ten Tools

In addition to the advantage of making subsequent pieces the turret lathe normally holds up to ten cutters ready on center and available for cutting at any time. To use the particular tool the operator merely indexes the turret and sets his cutter to size. He is therefore able to make many different types of pieces and runs of work without ever removing a cutter from the machine.

Since the turret lathe is designed as a production machine, it is capable of taking heavy cuts. Sometimes this is unimportant but since the tool room is often required to make pieces from standard cast shapes and standard bars, it sometimes must remove more material than does the regular production department. There is a definite advantage to be able to take heavy cuts at a time like this.

There are fewer time studies made in the tool room and therefore it is usually up to the operator as to what spindle speeds should be used. The turret lathe can now be equipped with an attachment that clearly shows the most effective surface feed for each type of work. The lathe then runs at the proper speed for each cut, regardless of diameter. This device allows the man to start, stop and reverse, as well as to change all speeds by using only one lever, similar to the gear shift lever on the automobile. The device in effect allows time study standards to be used with every piece done, automatically and constantly. In other words, production line efficiency in getting proper speeds can be obtained in the tool room.

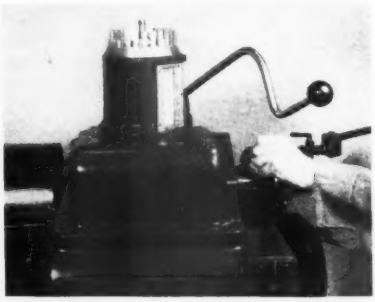


Fig. 2. *The Preselector permits proper speeds in feet per minute to be chosen for each work diameter. Here No. 5 of a series of predetermined speeds is being engaged. The automobile-type lever instantly brings the next speed into play.*

How the Turret Lathe Works Out in a Tool Room

In the Warner & Swasey shop, there is a No. 4 turret lathe used to make small bar and chucking parts in the tool room. The operator of this machine has before him all the blueprints of the work ahead. He is allowed quite a bit of discretion as

to the order in which parts should be made. In this way, he is often able to reduce setup time by machining, in sequence, parts which are similar and thus utilizing setups already made.

Tool work of all kinds, from one piece up, is done on this turret lathe, it being a strictly standard machine. It has a 3-jaw chuck, 4-jaw chuck, collet chuck and a fairly complete set of bar and chucking tools. In this particular case, threads are cut with a lead screw attachment. With the equipment on the machine and without removing any tools except drills, reamers, etc., the following operations can be done:

1. Turn
2. Face
3. Center
4. Drill
5. Bore
6. Ream
7. Thread
8. Knurl
9. Cutoff
10. Neck

The operator does all of this work with a minimum of setting-up time.

Tooling Must be Correct

In using a turret lathe in a tool room, it is essential that the tooling be correct if good results are to be obtained. A generous supply of cutters of these types should be on hand for the operator's use. Generally, the following tools work out best on the square turret:

Facing Cutter
Chamfering Cutter
Turning Cutter
Cutoff Cutter

For the hexagon turret, the following are usually used on short lot work:

Single Cutter Turner—for turning one diameter and burnishing work at the same time. (Used for two or more pieces, one piece lots usually done from cross slide.)
Center Drilling Tool—for centering bars.
Center—for supporting work when turning from cross slide.
Stock Stop and Starting Drill—can be used to feed out bars to the proper length and also to start drilled holes.
Knurling Tool—for knurling, either square, straight or diamond.
Clutch Tap and Die Holder—for threading with solid taps and dies.
Floating Tool Holder—for holding reamers.
Drill Chuck—for holding straight shank drills and other small tools.
Taper Drill Sockets—for holding taper shank drills in the turret.
Slide Tool—for holding boring bars for recessing, etc.
Boring Bars—for sizing holes.
Tool Holders—for extending turret tools closer to the work.
Two Die Heads—to cut threads within the capacity of the machine, with chasers, or a machine equipped with a lead screw.

Practically all of these tools are the shank type so they can be installed and removed from the machine with little effort. If a machine has this relatively small group of tools, practically all normal tool room work can be efficiently handled.

In view of these recent developments, particularly in new turret tools, the man in charge of the tool room, where the highest priced labor is employed and therefore the greatest savings are possible, must constantly check methods.

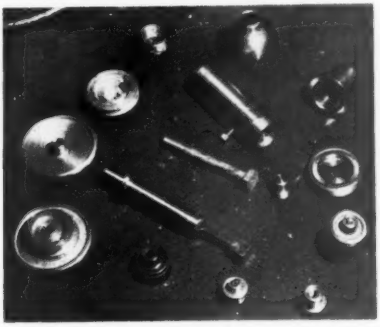


Fig. 3

A few of a wide range of parts turned in a Chicago shop gives evidence of the flexibility of the turret lathe in the tool room. Such miscellaneous jobs are accurately and profitably turned.

Rebuilding is Modernizing Too

By Browney Mascow, Vice President
Modern Collet and Machine Co.

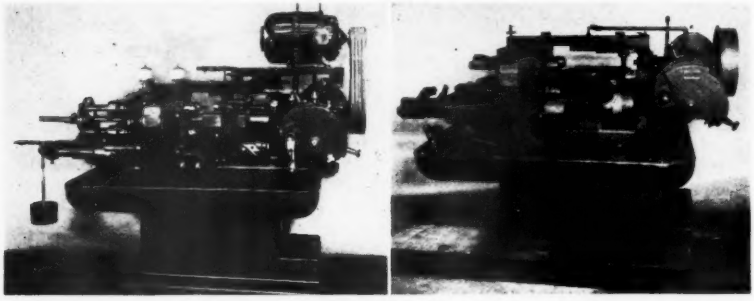
WHEN an automatic screw machine has had 30 years of hard service the chances are that it is about ready for the scrap heap. More than the wear and tear of thousands of hours of hard service, the obsolescence of the design would condemn such a veteran. However many, indeed most, of these machines need not be scrapped. The technique of rebuilding and modernizing screw machines cannot only restore original accuracies and capacities but can adapt the machines to meet modern requirements for production efficiency.

For example, the Model "F" ⅞" Gridley Automatic shown below at the right has depreciated through nearly 30 years to the point that it did not retain much more than its value as scrap metal. Certainly this machine seemed a rather poor possibility for rebuilding or modernizing. But the Modern Collet and Machine Company of Ecorse, Michigan, specialists in automatic screw machine rehabilitation, undertook the task. A complete rebuilding job was necessary.

The machine was stripped to the frame which was cleaned and painted. To assure longer life the tool slide and stem were lined with hardened and ground bushings so that the tool slide operates over hardened surfaces all the way around. Hardened and ground dove-tail cross slides were fitted and scraped in and set up with adjustments to further assure rigidity. Clutches of a new type, designed to eliminate a great deal of down time, were incorporated. The machine was equipped with a gravity oiling system set with oil cups that feed oil for eight hours with one fill-up.

Perhaps the most important improvements built into the new machine are the spindle carriers. The spindles are equipped in the front with taper bronze bearings running in hardened cups with a ball bearing end thrust bearing to take up all pressures. The rear bearings are needle bearings with ball bearing end thrust bearings. These types of bearings are used where there is no room for the usual taper roller bearing installations made by this company.

(Continued on Page 21)



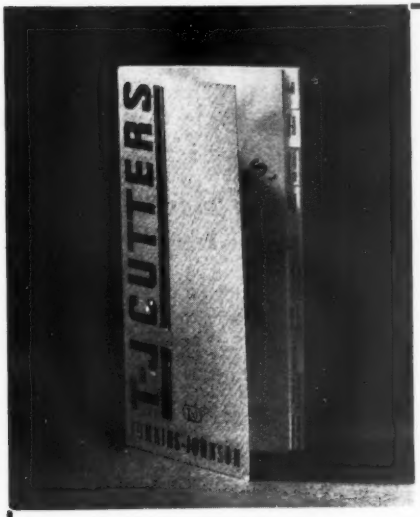
Two views of the Model "F" ⅞" Gridley Automatic—at the right the machine as it was received by the rebuilder, at the left as it went back to begin a new life of more efficient production service. Read the story for details.

Hydraulic Feed Surface Grinder for Tool Rooms

INCLUDED in the very complete line of Grand Rapids High Speed Hydraulic Feed Surface Grinders is the No. 25 Grinder designed primarily for tool room work. The No. 25 Grinder is built around a heavy, rugged, one-piece column and base casting similar in design to those used on the larger grinders. The longitudinal table movement can be operated either hydraulically or by hand. When operated hydraulically the control can be set to operate the table at practically any desired speed up to its maximum of over 60 feet per minute. A swivel type wheel guard, convenient for form tool grinding, is furnished as standard equipment. An 8" diameter grinding wheel is standard equipment when two spindle speeds are provided, a 7" wheel when the motor is mounted directly on the grinding wheel spindle. A patented elevating or vertical adjustment which permits the head to be moved a considerable distance quickly by means of a large hand wheel and set accurately by means of a circular vernier reading on a small flat dial in the center of the hand wheel, standard on the larger Grand Rapids Hydraulic Feed Surface Grinders, can be mounted on special order. This is also true of the Bijur one-shot lubricating system. Either the portable coolant system or the dust collecting system may be had with the No. 25 Grinder.

Also in the Grand Rapids line is the No. 3V Vertical Spindle Hydraulic Feed Surface Grinder with direct spindle drive, motor driven power rapid traverse, automatic down feed with automatic throw-out and a range of speeds from as slow as two feet per minute up to over one hundred feet per minute. This machine is ideal for grinding dies, with guide pins in place. It is also excellent for miscellaneous tool room grinding on such work as parallels, hardened washers, punches, small flat dies and similar work.

A new catalog, GL-100, illustrated and in color, gives full specifications and features of the larger Grand Rapids Hydraulic Feed Surface Grinders as well as those of the die and tool room grinders. For a copy of GL-100 write Gallmeyer & Livingston Co., Grand Rapids, Mich.



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TOOLING programs usually include large numbers of medium and small parts which require milling machine work both on horizontal and vertical machines. To overcome the frequent necessity for using larger equipment than is necessary for such work, the No. 39 Index High Speed Vertical Milling Machine has been developed. In shops without vertical milling machines an attachment has to be used to convert a horizontal mill and frequently is is a machine tool whose capacity is considerably larger than the type of the work in hand. Then there is much time consumed in mounting and dismounting the attachment and it is such an experience of a user of the No. 39 Index Mill which brought forth the comment . . . "We can now do the fifteen minute jobs in fifteen minutes". This effects in their case a substantial saving because it required from one-half hour to an hour to *prepare* to do the "fifteen minute" job.

The No. 39 Index Mill, although lighter in comparison with the conventional milling machine, is substantially built, with column and base cast integral, reinforced at vibrational points. The chrome-nickel steel spindle, accurately ground with a No. 9 Brown and Sharpe taper, runs on super precision ball bearings which are factory sealed and guaranteed for a minimum of one year service without attention. Six spindle speeds are available from 375 to 2820 RPM. The miller has a capacity permitting the use in tool steel of $\frac{3}{32}$" to $\frac{5}{8}$" end mills. The overall height is 68" and table dimensions: Working surface 8" x 22"; overall length 32"—3 slots. The mill is powered by a ⅓ HP heavy duty single phase repulsion and induction motor and requires no installation cost.

A swivel head with graduations 90 degrees both ways is controlled by a mechanical swiveling device which consists of a worm and worm gear mounted in a bracket at the top and rear of the column and connected with shaft run-

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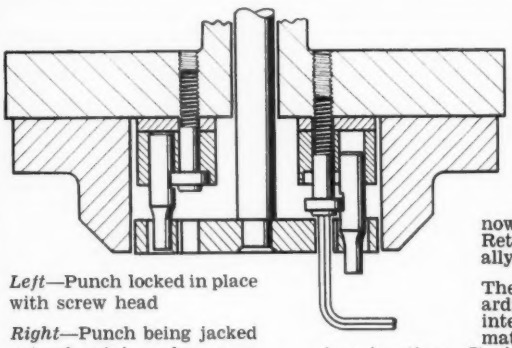

Left—Punch locked in place with screw head

Right—Punch being jacked out of retainer by screw head

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ning through column and pinned to head. The movement of the quill to the extent of 3¼" is controlled by a screw and nut which has definite advantages over the conventional rack and pinion type. This makes the machine adaptable for angular precision drilling and boring as well as milling. When this spindle travel for angular drilling and boring is not required the machine can be supplied at a considerably reduced cost.

The milling of keyways is another feature of the No. 39 Index Mill. A two lip spiral end mill is used like a drill, with very satisfactory results.

The manufacturer points out that the Index Mill does not replace the ordinary milling machine but that it does provide relief for such larger equipment on so-called "nuisance" jobs. Its low initial cost justifies installation as auxiliary equipment and for smaller shops it is entirely suitable as a primary machine.

For complete specifications, names of users and prices, write Blank & Buxton Machinery Company, Jackson, Michigan. Please ask for new Index Bulletin No. 2.

Rebuilding Is Modernizing Too

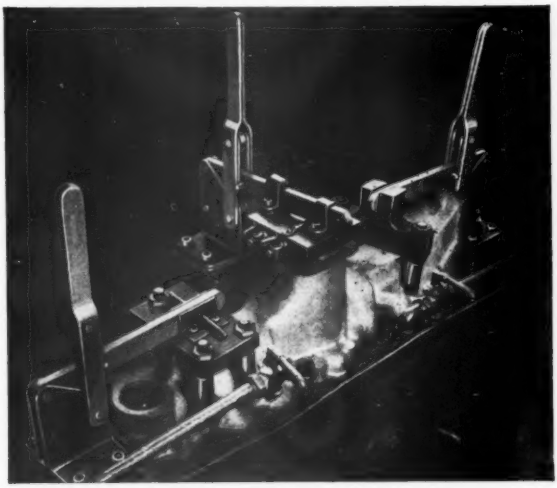
(Continued from Page 18)

The rigidity of these bearings and the accurate fitting of the slides enable the finished machine to turn out the finest type of work with ease.

The completely rebuilt machine is the same in its operation as a Model "G" machine. Tooling can be applied in all four positions. The machine carried the standard unconditional guarantee for index accuracy to within .002 on both vertical and 45-degree tests.

The Modern Collet and Machine Company with their new plant addition, designed expressly for the efficient handling of all types of screw machine rebuilding, can rebuild a number of machines within a very short period of time.

This service is of particular value to machine users who may not have sufficient stand-by equipment to carry their routine production. The increase in production efficiency of the rebuilt machines will absorb both the down time and the rebuilding costs. On a recent job of rebuilding thirty machines for one of the country's leading screw manufacturers, actual tests disclosed that each machine's production was increased from ten to twenty-five per cent.



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Hanna Builds Cylinders "to fit the job"

DESIGNERS and builders of special and standard machines and plants whose equipment operates hydraulically or with air will be interested in two technical data catalogs published by the Hanna Engineering Works. No. 228-D entitled "Push-Pull-Raise-Lower with Hanna Cylinders" and No. 229-M "Hanna Hydraulic Cylinders" are veritable hand-books for the man who designs, builds or operates.

Hanna Cylinders are made "to fit the job". Diagrammatic drawings with dimensional charts indicate sizes of all parts. There are models especially adaptable for every kind of service with every type of equipment. Plain and cushioned models are described. In metal working plants these cylinders are used for lifting and shifting parts and unloading and loading machines, opening and closing gates on hoppers and for air clamps, jigs and fixtures.

The simple design and sturdy construction of Hanna cylinders insure freedom from maintenance worries and costly shutdowns. The only parts subject to wear are piston packings and the repacking of a piston is simplified by the strain rod and flange construction of the Hanna cylinder. The cylinder head may be removed and piston withdrawn without dismantling the cylinder unit or removing the mounting bolts. The Hanna cylinder is easily installed and will function in any position.

The extensive line of standard cylinder units manufactured by Hanna usually makes it possible for the user to select a model which is easily adaptable to the service requirements where it is to be installed, thus a considerably lower first cost is assured. The air cylinder particularly, because of this low first cost and in addition its economy of operation and simple abusive-proof construction, is recognized by the designing and building engineer as an unusually effective method for obtaining straight line motion.

The Hanna line of hydraulic cylinders for use with oil or water is equally complete. Non-adjustable cushions are furnished as standard equipment and at no extra cost. These cylinders are designed to be of minimum size, they are specially bored to achieve a concentric mirror

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finish, strain rods are not used thus permitting removal without dismantling the cylinder and pistons are fitted with rings thus assuring effective seals and eliminating necessity for periodic replacement of packings.

Write Hanna Engineering Works, 1759 Elston Avenue, Chicago, Illinois, for catalog 228-D—Air Cylinders and 229-M—Hydraulic Cylinders.

Engineering Data on Composite Die Sections

ELECTRICALLY welded composite steel die sections have been developed until they have taken their place as one of the modern efficient methods for building dies. In those instances where the use of such sections is practical, they offer several clear-cut advantages. The electric welding of a tool steel cutting edge to a non-hardenable mild steel base assures good die construction and at the same time accomplishes it with less machining and a lesser labor cost. Screw and dowel holes may be drilled easily after machining and hardening have been done, expensive lapping operations are generally eliminated and the sections fit securely on the die shoes. When there is a slight warpage, straightening may be done without difficulty. When greater hardness of the cutting edge is desirable there is a distinct advantage in having the mild steel backing to act as a "cushion".

The Forging and Casting Corporation has available for all die designers and builders an engineering data folder which explains the method of construction of a composite steel sectional die and comprehensively lists dimensions of 36 standard sections, their weights and prices per pound with water hardening, oil hardening or carbon vanadium tool steel cutting edges. Instructions in detail on how to order are given and the circular is accompanied by a dimensional blueprint of standard shapes. Prices on air hardening and high speed steel sections and shapes which must be specially designed are available on request.

The FCC engineering data folder and blueprint described may be had by writing The Forging and Casting Corporation, Ferndale (Detroit), Michigan.

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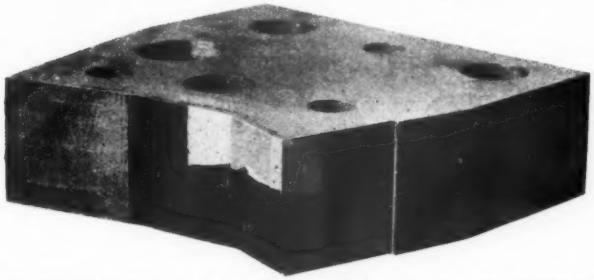

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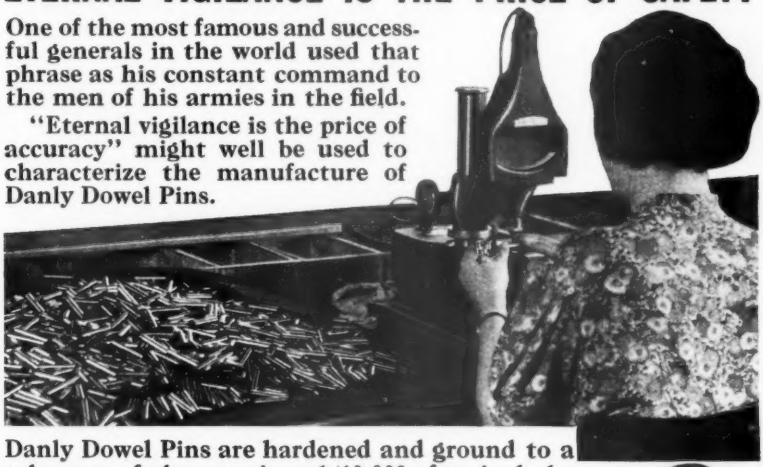

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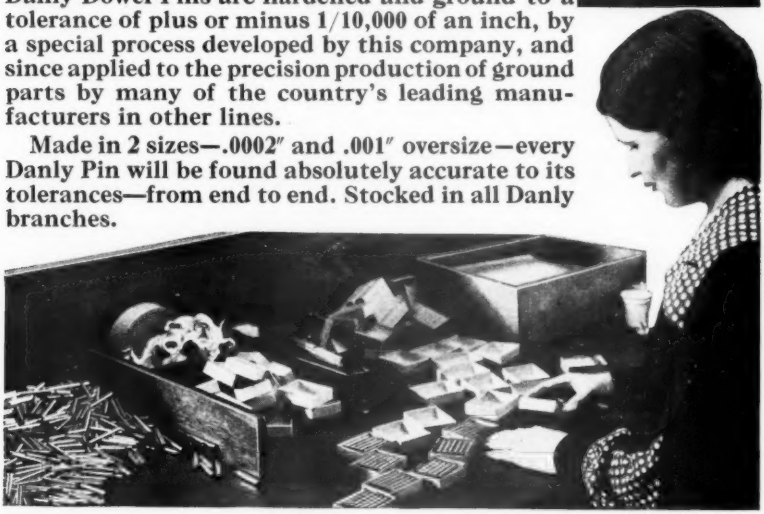

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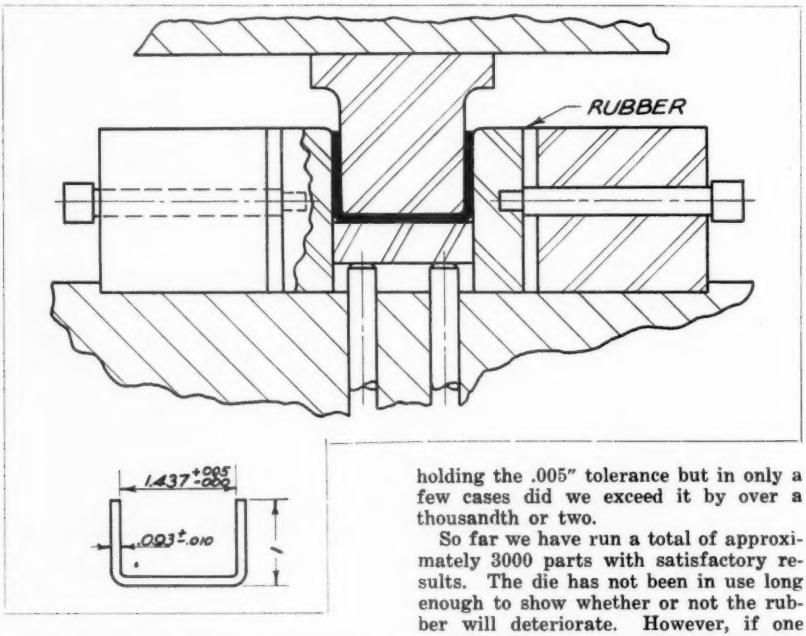
Shop Kinks

This Department, created by the interest of our readers, will be a regular feature of T·D·M PROGRESS. Readers are invited to send their "pet" shop hint or kink to the Editor.

Rubber Backing-Up for Variable Material in Forming Die

SOMETIME ago we were confronted with the problem of forming into a "U" a part made of 3/32" (.09375") silicon iron. The thickness of this material varied as much as .020" and the distance between the open ends was held to a tolerance of .005". It was obvious that an ordinary forming die would not in this case produce a satisfactory part.



The writer, in order to overcome the difficulty, designed a die which is shown in the sketch. It is hardly necessary to describe it inasmuch as the drawing speaks for itself. The two forming blocks are backed-up with pieces of rubber which are compressed by means of the screws shown so that the blocks are under considerable tension. If the die were open, that is, if the punch were out of the die, these blocks move toward each other so that the clearance between them and the punch is approximately .010" less than the minimum of material thickness.

This solved our problem quite satisfactorily. We did not always succeed in holding the .005" tolerance but in only a few cases did we exceed it by over a thousandth or two.

So far we have run a total of approximately 3000 parts with satisfactory results. The die has not been in use long enough to show whether or not the rubber will deteriorate. However, if one considers the abuse received by rubber cushions used with drawing and forming dies, it is conceivable that the rubber in this die would stand up a considerable length of time.

P. A. Clark, Methods Engineer, Minneapolis-Honeywell Regulator Company, Minneapolis, Minn.

Research Creates Precision Welding Rods

DARWIN & MILNER, Inc., American Division of Darwin's Ltd., original manufacturers of non-deforming High Carbon High Chromium Steels, announce a new development—Welding Rods.

For a long time this company has conducted researches in the field of Arc-Welding Rods under the direction of H. A. Gonser, well-known authority in the welding of unhardened and hardened high grade steels. Special attention was given to welding without annealing and rehardening.

These researches brought to light many characteristics much different from generally accepted conceptions. Due to the intense heat which produces changes in crystals in very small steps, great precision is necessary in the selection of Welding Rods. Research demonstrated that a number of Air-Hardening Welding Rods now on the market, developed to weld various high grade steels, actually weld only a limited number of such steels due to the dilution of carbon contents of both deposited and base metals. As a result of the researches, Darwin & Milner has recently placed on the market specially developed and selected Arc-Welding Rods.

In keeping a very close check on the many difficult welding jobs on High Grade Steels, it was found that small differences in the metal deposited on the parent metal make a great difference in hardness, abrasion and impact values. It has been found that the higher quality and higher priced high grade Die Steels such as Cobalt Chromium are more adapted for being welded-on in the hardened stages than the lower qualities of steel and these researches add to the proven fact that the advantage lies always with the better products.

By means of a process using a special hardening solution cutting edges on special tools were developed with the Arc-Welder. The hardening furnace was eliminated because of the use made of the heat of the Arc-Welder itself.

The hardness of such tools is equal to 18-4-2 High Speed Cutting Tools with good resistance to impacts, such as in Broaching and Poking Tools. Due to the simplicity of this process of building up a tool by welding the average operator has very little difficulty in getting the best results.

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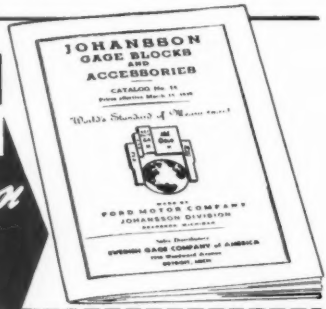

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Die Designing and Estimating (V)

(Continued from Page 13)

hours and are based upon the units determined according to the procedure already described. The table is to be used for estimating closed die openings, i.e., regular or odd shaped holes of designated sizes in solid die blocks.

We have now reached the point at which we should be able to apply our method of time unit determination to the parts which have been described. Each of the 4 sides measures 1", a total of 4"; also we determined previously that it consists of 4 time units. The thickness of the die block as previously determined is 1⅛". (Fig. 2, Page 16, February issue).

The first horizontal line of Fig. 14 designates perimeters in inches. The second horizontal line gives time units in hours. The first vertical column lists die block thicknesses. Figures in all other columns represent time designated in hours.

A of Fig. 13, having a perimeter of 4", move to the right accordingly. With 4 time units established, we use the vertical column under 4, moving down to the point opposite 1" (Die Block Thickness) we arrive at 4 hours as the time required to machine the die opening to the line. For determining the time for finishing the opening, a table will be found in the next chapter.

B of Fig. 13 will require the same time as A, assuming all dimensions to be identical. C also has a perimeter of 4" but consists of 8 units and for the same die block thickness will require 6 hours for machining.

D with its 12 units, but other dimensions identical, requires 8 hours as indicated on our table.

It ought to be helpful to consider again the reason for the increase from 4 hours for machining A to 8 hours for machining D because it is this variation in design which can easily catch an estimator off guard. With all dimensions identical, if he does not recognize the much more difficult and time consuming operations necessary to machine D as

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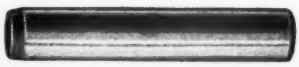

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compared with A, he can very easily underestimate the cost of that operation. Herein lies one of the danger spots when "guesstimating" is substituted for genuine estimating. To repeat: The radii in A can be easily started and finished in the drill press after which the core is removed, whereas with D a series of indicator setups in the lathe, boring, milling or jig borer are required because the holes run into each other. Great care must be exercised during these boring operations and afterwards there still remains the problem of removing a core with ragged edges.

Now enter on the estimating sheet in column D opposite "Die" 4 hours for rough machining the die opening.

The reader is advised to practice using the table in Fig. 14 as applied to dies for stamping parts of various other shapes and dimensions.

In next month's installment, Mr. Dannes will deal with the method of computing the time for finishing die openings and punches. He will also deal with stock removal and estimating for shedders, strippers and punch plate openings.

New T-J Cutter Catalog for Die Sinkers and Tool Makers

Insisting that the importance of a good cutting tool cannot be over-emphasized and that the higher standards of efficiency upon which new machines are built make it more important than ever that the new cutting tools are correctly designed, The Tomkins-Johnson Company has issued a new catalog No. 139 in which they list their very complete line of cutters for die sinking and tool making. These cutters are made of the best possible materials, properly machined, scientifically heat treated and accurately ground. The manufacturer states that their T-J cutters are made to these exacting standards and as a consequence are sturdy, hold a sharp edge longer, cut easier, carry less breakage and are gratifyingly long lived.

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(*Continued on Page* 31)

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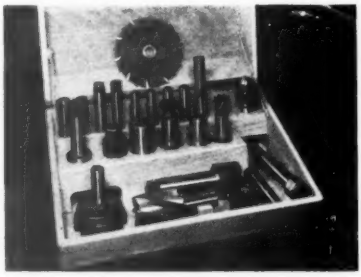

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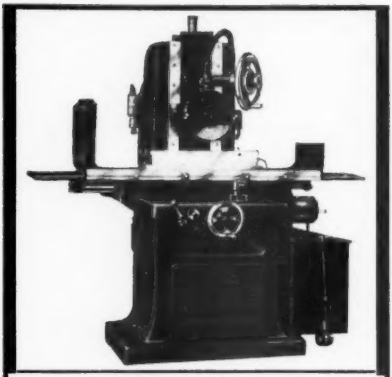

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(Continued from Page 14)

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We use a rather unique, patented vacuum process for filling our casting dies. This vacuum process draws or sucks the molten metal into the dies. It is the complete reverse of the design of conventional die-casting machines in which pressures are employed to force the metal into the dies. Vacuum lines are attached to the dies and atmospheric pressure on the molten metal in the furnace pots is thus the filling medium. The die opening or sprue is put below the surface of the molten metal in the furnace pots and thus we have no oxide inclusions to contend with in our castings. The ability to keep aluminum oxide out of the body of the castings is an advantage of the vacuum process. This is a very troublesome problem in aluminum bronze die casting by other methods. The metal is taken into the dies at from 1800° F. to 2200° F., depending upon the particular alloy we are using at the time and the design of the casting.

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cavity. These risers often are protected by asbestos sheets to insure that the metal in the risers remains liquid until the entire die cavity is filled. The shrinkage of the casting as it solidifies permits the molten metal in the risers to flow back into the die cavity, assuring solid castings.

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New T-J Cutter Catalog for Die Sinkers and Tool Makers

(Continued from Page 29)

nearly all of which are carried in stock. Specifications and prices on roughing, angle, bass, slotting or router cutters, end mills, collet chucks and collets are listed in the new catalog No. 139 now ready for trade distribution.

For your copy of new, tab-indexed, illustrated T-J Cutter Catalog No. 139, write The Tomkins-Johnson Company, 630 North Mechanic Street, Jackson, Michigan.

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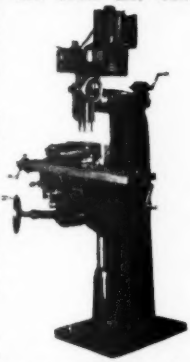

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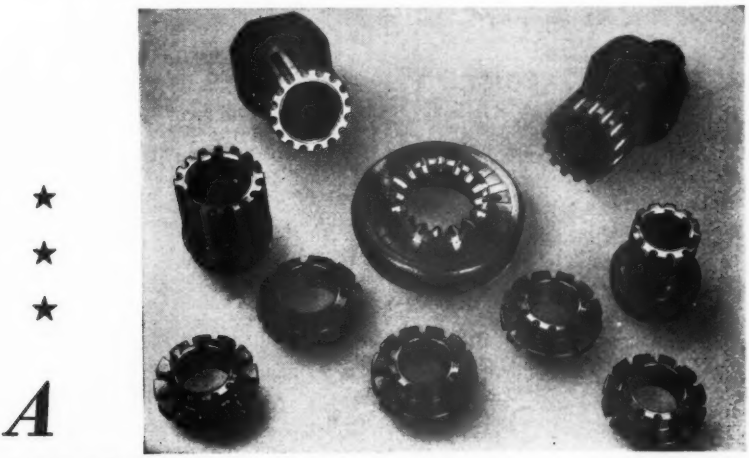

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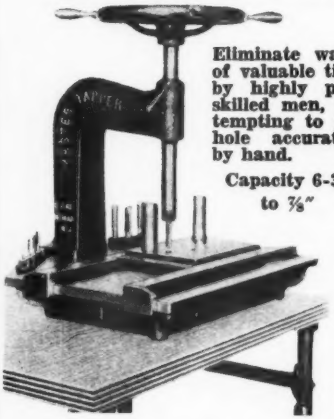

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TAPPER—Precision
The Master Tapper Co., 2 Main St., Belleville, N. J.

TAPPING MACHINES
Buffalo Forge Co., 477 Broadway, Buffalo, N. Y.

TAPPING MACHINES—Tool Room
The Master Tapper Co., 2 Main St., Belleville, N. J.

TOOLS AND DIES—Carboloy
Kiffer Tool & Die Co., 5601 Tillman Ave., Cleveland, Ohio.

TOOLS—Cemented Carbide Tipped
Eclipse Counterbore Co., 7428 St. Aubin Ave., Detroit, Mich.
McKenna Metals Co., 500 Lloyd Ave., Latrobe, Pa.

TOOL CHESTS
Gerstner Tool Chests, 56 Columbia St., Dayton, Ohio.

TRANSFER SCREWS
Nielsen Tool & Die Co., 1859 Gardner Avenue, Berkley, Michigan.

TRANSMISSION NUTS
Ohio Ball Bearing Co., 6531 Euclid Avenue, Cleveland, Ohio.

TUBING—Tool Steel
Bissett Steel Co., The, 947 E. 67th St., Cleveland, Ohio.

TYPE HOLDER
H. O. Bates, 251-257 North Broad St., Elizabeth, N. J.

VALVES—Operating
Hanna Engineering Works, 1759 Elston Ave., Chicago, Ill.

VENTILATING APPARATUS
Buffalo Forge Co., 477 Broadway, Buffallo, N. Y.

WASHERS—Special
Detroit Stamping Co., 3443 West Fort St., Detroit, Mich.

WELDING
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Overly-Hautz Co., 1617 West 116th St., Cleveland, Ohio.
Star Tool & Die Works, 2522 24th St., Detroit, Mich.

WELDING PLIERS
Knu-Vise Products Co., Inc., 6433 Cass Ave., Detroit, Michigan.

WELDING RODS
Darwin & Milner, Inc., 1260-1264 West 4th St., Cleveland, Ohio.

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for every type of machine and position of application.

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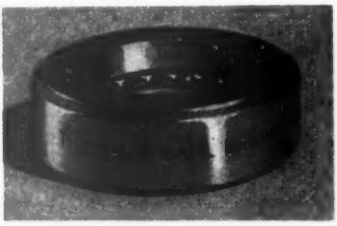

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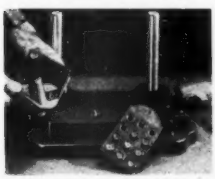
Locate drill holes perfectly and quickly



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time of other methods and eliminate spoilage.

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Eighteen standard shapes and sizes made up in five different cuts. Adaptable for all classes of work and for all kinds of materials. Try them on your next job.

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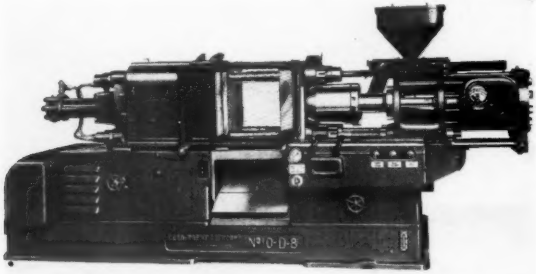
When you order or write about products described in TDM PROGRESS please mention the publication.

The Reed-Prentice Injection Machine Features Magnetic Heating Cylinder

THE operation of the Reed-Prentice magnetic heater, subjecting the body of the heating cylinder to an alternating magnetic flux to produce a remarkably even heat distribution throughout the cylinder, is unique. This is accomplished by using hysteresis losses for heating. According to the manufacturer, the heater body of hardened steel, having high coercive force (making hysteresis effect large) and high specific resistance (making eddy currents small), makes this method practical.

Die plates are steel, the stationary plate being cut from a solid plate, the movable plate being a ribbed casting provided with bronze bushed bearings. Plate clamping and knockout devices are provided.

A centralized control panel permits ease of control on manual operation and instant cycle selection for semi- and for full automatic operation. On automatic control three time clocks electrically complete a cycle—one clock controlling period of plunger pressure, another the time for solidification and the third clock the opening of the mold.



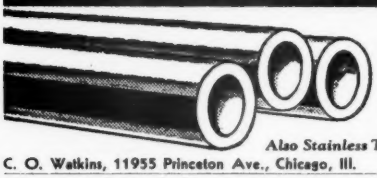
The combination of the annular injection plunger, perfect streamlining of the passages in the cylinder and technique of manufacture practically eliminates discoloration from overheating, and also permits color changes to be made in a few shots.

Toggle mechanism is similar to that of the Reed-Prentice die casting machines; links have steel castings, full-floating link pins operate in lubricated hardened steel bushings. Entire toggle end, also injection end, of the machine is adjustable through a screw mechanism operated by hand ratchet wrench.

The Reed-Prentice injection molding machines are made in four sizes, that mold 2, 4, 6, and 8 ounces per shot respectively. Model 10D-8, the 8-ounce machine, is shown.

A new leaflet illustrated with photographs and diagrammatic drawings and giving full specifications of the Reed-Prentice Injection Molding Machines may be had by request to Reed-Prentice Corp., Worcester, Mass. Please mention TDM PROGRESS when you write.

OIL HARDENING TOOL STEEL TUBING



Substantially reduces labor costs by eliminating the expensive procedure of drilling from the solid. BISCO TOOL STEEL TUBING is a fine grade tool steel in tubular form available in sizes up to 14" diameter and 2" wall thickness; other sizes to your specification.

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947 E. 67th St., Cleveland, Ohio

Also Stainless Tubes, Mechanical Tubes, Aircraft Tubes, Pressure Tubes

C. O. Watkins, 11955 Princeton Ave., Chicago, Ill. Victor Brook, 433 Rockingham St., Rochester, N. Y.

When you order or write about products described in TDM PROGRESS please mention the publication.

Pioneer Introduces New Series Coolant Pumps

A NEW series of Coolant and Lubricant Pumps designed especially for use with machine tools or auxiliary tanks where the unit must be driven with a flat or V-belt, chain, gear or flexible coupling, or where it is impossible or impractical to mount their motorized models, has just been announced by the Pioneer Engineering & Manufacturing Company.

The new pumps are particularly desirable for use on export shipments or any installations where the electrical characteristics tend to alter the motor speed and therefore the delivery of the unit.

The Model FV (Foreign Vertical) and the Model FB-V (Foreign Bracket Vertical) are designed is such a way as to be submerged directly into the tank or reservoir and to be attached to the side of the tank or machine as required. The Model F-VB is built to mount on the side of a coolant tank or machine pedestal for close coupled installation. No auxiliary inlet piping is required.

These units are of the open impeller type with particular attention being paid to obtain higher efficiencies and higher heads than conventional types, thereby permitting the use of filters. Abrasives or other foreign matter in suspension in the liquid will not damage or impair their efficiency or life.

A special mechanical seal, designed to eliminate shaft friction, the need for repacking and the necessity for maintaining pump locations in relation to liquid level, particularly in the F-VB model, is used in all Pioneer pumps. These pumps operate at motor speed or otherwise and require no relief or bypass valves in the delivery line to protect the pump or motor when the coolant supply is throttled.

Full information on the new Coolant & Lubricant Pumps, as well as the entire Pioneer line, may be obtained by writing Pioneer Engineering & Manufacturing Company, 31 Melbourne Avenue, Detroit, Michigan. Ask for Engineering Data P-6.

HANDY RACKS

Four times the capacity in convenient floor and height space. Widely used in tool steel factories, warehouses, large and small shops. Very small cost—no crating required.

30 day approval. Send for circular.

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Rivett Bench Lathes Now Timken Bearing Equipped

RIVETT, pioneer in bench lathe development, is now building these units equipped with Timken roller bearings designed to give the lathes longer precision life. The Timken "Zero" precision roller bearings are rated to carry 1175 pounds radial pressure and 1180 pounds end thrust at over 2000 R.P.M. continuous duty, a margin of spindle safety impossible with plain bearings.

Bench lathes used in the tool room and production departments are often

(Continued on Page 44)

Onsrud

50,000 R.P.M. Turbine Grinder

- ¼ Horse Power
- Weight 1 lb. 15 oz.
- Automatic Lubrication
- Vibrationless
- Balanced
- Trouble-Free

Experienced die makers will tell you why they like the Onsrud MD-1 Grinder. Here is a 50,000 R.P.M. unit with ¼ h.p. that actually makes the work fly. Handles with superb ease. Won't heat up by overloading. Stays out of the repair shop because it is sturdily built. Can also be mounted and used as a stationary grinder.

Write for Bulletin

ONSRUD MACHINE WORKS, Inc., 3914 Palmer St., Chicago, Ill.

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The Catalog Review

Brief descriptions of current industrial literature including technical booklets and bulletins, catalogs and circulars. All may be had upon request, without charge. . . . Please use identification numbers.

MODERN COLLET AND MACHINE COMPANY CATALOG. — Modern Collets are made of a special steel with a hard long-wear surface and a tough, springy core. They are deeply corrugated to give a better gripping surface so that locking fingers and shoes last longer. It is claimed that the multi-grip equalizing collet design requires less power to chuck up, giving longer life, permitting heavier cutting feeds and reducing scrap to a minimum. Pushers, pusher tubes, finger holders, cams and other screw machine repair parts and tools are also described and illustrated in new catalog No. 33. A price list for parts of many well-known machines is also included. The Modern screw machine rebuilding service is also outlined. For your copy of catalog 33, write Modern Collet & Machine Company, 407 Salliotte Street, Ecorse, Michigan.

TWO ALLIS-CHALMERS BULLETINS ON MOTORS AND MACHINE TOOLS.— Of particular interest to machine tool builders and users, including both standard and special tools, are the two bulletins "Making Machine Tools Earn Their Way" (No. 1196) and "Save on Service Costs" (No. 1195). Both bulletins deal with Allis-Chalmers induction "Lo-Maintenance Motors" which are particularly adapted to machine tool drive. "Making Machine Tools Earn Their Way" presents by pictures and facts the advantages of "Lo-Maintenance" motors on modern machine tools, giving many valuable hints on motor adaptations. "Save on Service Costs" is an engineering presentation of Allis-Chalmers squirrel cage induction motors, a few features of which are shock-proof and distortionless cast steel frames, sealed stator winding, bakelite stator shield, silver brazed indestructible rotor, dust and leak-proof bearings. Electrical characteristics to fit every type of machine tool job may be obtained, many of them standard. For copies of bulletins No. 1196 and No. 1195 write Motor Division TD-8, Allis-Chalmers, Milwaukee, Wisconsin.

NEW LOW PRICES ON JOHANSSON GAGE BLOCKS.—New prices on Johansson Gage Blocks, the lowest in Ford history, are announced in the latest catalog, No. 14, on Johansson Gage Blocks and Accessories. The world famous "Jo" Blocks are made to solve four metallurgical and mechanical problems; flat surfaces in steel, parallel surfaces in steel, accuracy as to dimensions in steel and effective seasoning in steel. Standard sets of 81 blocks will make 120,000 different size gages, in steps of .0001", from minimum size .200" to more than 12". Three limits of accuracy "B" to ± .000008"; "A" to ± .000004" and "AA" to ± .000002". Blocks may be bought individually and in any combination although it is advantageous to buy blocks in various sets described in the catalog. Accessories are included in the catalog. The inspection and reconditioning service is also given in detail. for a copy of Catalog No. 14 write Ford Motor Company, Johansson Division, Department H, Dearborn, Michigan.

R. M. B. MINIATURE BALL BEARINGS OFFER NEW FACILITIES.—R. M. B. Miniature Ball Bearings in sizes from 1.5 mm (slightly less than .060") O.D. to 12 mm (slightly less than .5") O.D. are available in a wide variety of types for the requirements of designers of gages, speed indicators, recorders, small motors and other delicate and precision apparatus. R. M. B. Miniature Ball Bearings are made from strips of special steel, ball races are thin enough to use comparatively large balls, which are highly polished spheres of uniform den-

sity and hardness. The balls travel on the spherical portion of the race, giving resiliency of the whole assembly and ability to withstand relatively severe shocks. R. M. B. Miniature bearings are easy to mount, the radial types are fitted as standard bearings, the axial types are pressed in holes, milled, bored or cut in any other way. For full data write Landis & Gyr, Inc., 104 Fifth Avenue, New York City, for TD-41.

U. S. PRECISION LATHE GRINDERS.— The Model HLGE is a precision tool for external and internal grinding; it may be mounted on lathes, planers, shapers, milling machines, boring mills and can be used in a vertical or horizontal position. A T-bolt mounting permits radial and vertical adjustment of tool. External and internal quills are interchangeable. The Universal motor is equipped with housing air cleaner and fan on armature shaft. Four pulleys provide a range of nine speeds. One external quill, one internal quill, four grinding wheels, two belts, diamond dresser, wheel and belt guards are standard equipment. Model HLGE is made in 3 sizes mounting ¼, ½ and ¾ HP motors. A lightweight grinder for vise or bench work is also available. Write United States Electric Tool Company, Cincinnati, Ohio, for Catalog TD-44.

SJOGREN SPEED COLLET CHUCK.— Sjogren Speed Collet Chuck for toolroom, engine and turret lathes, milling machines, grinders and special production machines gives, the manufacturer states, increased capacity by eliminating a draw tube, keys and wrenches, saves time by its simplicity and assures machinist efficiency because it eliminates lost time and waste motion.

The Sjogren Speed Collet Chucks, furnished in three sizes (1", 1⅜", and 1¾" capacity) are amazingly fast, a turn of the handwheel one way or another automatically opens or closes the collet, releasing or gripping the work as desired. Tool room and engine lathes with threaded nose spindles require an adapter plate which usually can be obtained from the lathe manufacturer semi-finished. Sjogren Speed Collet Chucks fit lathes with #1 or #2 Tapered Key-Drive Spindle nose or standard D-16" Cam Lock spindle nose. These do not require an adapter plate. Hardinge

(Continued on next Page)

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Ground from the Solid

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Die Designing and Estimating

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—Albert O. Hill, Instructor Tool and Die Making
Samuel Gompers Trade School
San Francisco Public School

(Mr. Hill ordered 22 copies—Editor)

The first Shop Edition of DIE DESIGNING AND ESTIMATING is still $1.00 per copy, postpaid. Send your order to Tool·Die·Machine PROGRESS, 2460 Fairmount Blvd., Cleveland, O.

The Catalog Review

(Continued from Page 39)

spring collets are furnished for use with Sjogren Speed Collet Chucks. For full information address Hardinge Brothers, Inc., Elmira, New York. Ask for Data Sheets TD-43.

MIKRO-LOK JIG BORING BARS.—The new line of Mikro-Lok precision boring tools, the result of five years of development, testing and actual job operations is described in catalog No. 40, issued by Eclipse. The advent of the jig boring machine and the introduction of cemented carbides for removing stock at high speeds made necessary new and superior hole-finishing methods. Boring bars, for example, are now required to have adequate rigidity and cutting ability and facilities for quick accurate adjustment to very close limits. Mikro-Lok Jig Boring bars, micromatic adjusting and self-locking, have blades adjustable in increments of .0005". They are especially adapted to boring to a shoulder or to the bottom of a hole or for making intermittent cuts. Specifications and prices of double end-bladed boring bars, reaming bars, multiple boring tools and combination production tools are also given in catalog No. 40. For your copy write Eclipse Counterbore Company, 7428 St. Aubin Avenue, Detroit, Michigan.

CERROMATRIX SAVES TIME, COST IN DIE CONSTRUCTION.—Cerromatrix, an alloy of bismuth, lead, tin and antimony, is rapidly growing in favor for use in the mounting of dies and punches. The manufacturer states that Cerromatrix substantially reduces the cost, time and uncertainty involved in die construction chiefly for two reasons: (1) it makes it unnecessary to use complicated holding devices; (2) it provides a fast and accurate method of locating blanking, piercing and trimming punches in relation to dies without the need of machining non-working surfaces to close dimensions. The alloy is sufficiently hard to hold punches and die parts permanently in their proper locations. It has the unique property of expanding slightly on cooling (approximately .002"). Cerromatrix is said to be economical for small as well as large dies and for long as well as short runs. A catalog giving details of the many applications of Cer-

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romatrix with numerous job photographs is available on request to the manufacturer, Cerro de Pasco Copper Corporation, 48 Wall Street, New York City, N. Y.

CROMOVAN TRIPLE DIE STEEL. — Cromovan Triple Die Steel, an improved composition of a higher alloy content than the original Triple Die Steel of the same manufacturer, is recommended for especially long runs and is used for cutting and forming dies such as trimming, blanking, stamping, cold-forming, extrusion, drawing, swaging, pressing, coining, shearing, slotting dies and for special applications as some types of punches, plug or ring gages, taps, bushings, reamers, spinning tools and shear blades.

Characteristics claimed include good machinability in the annealed condition, very little dimensional change during hardening, intense hardness from air-cooling or oil-quenching, unusual depth of hardness to prevent sinking, high resistance to abrasion, non-scaling properties and corrosion-resistance.

A catalog giving full data is available from the manufacturer, Firth-Sterling Steel Company, McKeesport, Pennsylvania. Ask for TD-42.

SCHERR CATALOG LISTS NEW TOOLS. —The new George Scherr Company general catalog lists for the first time a number of items of particular interest to tool rooms and die shops, including a sine bar, bevel protractor, which measures to 1 minute of arc, a dial indicator bevel protractor, an indicating plug gage for checking bores for size, taper, oval form and bell-mouth and a Bore Inspection Telescope for inspecting interior surfaces of tubes, pipes, forgings, barrels, hollow sections of airplanes and other articles, in order to reveal defects, wear or rust. The general catalog shows a complete line of machine tools, instruments and machinery. Mechanics' tools such as vernier calipers, height gages, micrometers and plug gages, comparators and projectors are listed. Gear hobbers, grinders and testing equipment, thread and worm millers, relieving lathes, jig borers, hand tachometers and lathe chucks are also included. Copies of new catalog will be sent on request by the George Scherr Company, 126 Lafayette Street, New York, N. Y.

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Stand for Quality

We made the *first* HIGH CARBON-HIGH CHROME Steels which were also NON-DEFORMING, opening the way to

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Systematic Care of tools pays the employer in increased production. The men will do more work and do it more easily when they care for their tools in a *Gerstner* Chest. The choice of particular men for 30 years. *Free Catalog.*
GERSTNER TOOL CHESTS
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Rivett Bench Lathes Now Timken Bearing Equipped

(Continued from Page 37)

subject to extreme stresses in addition to the demand for precision. The headstock spindle is heat treated alloy steel with either a threaded or tapered nose as selected. The headstock is accurately scraped to a full bearing on the lathe bed, which follows Rivett design that beds are in heavy box section with guideways presenting maximum bearing areas for locating and moving attachments and as three-point mounting of the bed on separate pedestals is invariably used, the alignment of all elements is permanently assured.

The power unit is a three-fourth HP constant speed, reversible motor, which may be used with a speed box motor drive, a self-contained splash lubricated power transmission unit, horizontal safety drive or direct drive.

The standard tailstock is offset type with hardened, ground and lapped one inch diameter alloy steel spindle. Travel is effected by means of a ball handle and screw working in a bronze nut and measured by graduations visible through the opening on top of the frame. The tailstock equipment includes a hardened male center.

The compound precision slide rest includes a base, upper and lower slide with a swivel between and feed screws to provide slide movements. It is built in two types—Eccentric Tool Holder and Rocker Tool Post. A ball turning rest is also available.

Bulletin 505-RBP, giving full details, illustrations and specifications of their bench lathes can be had by writing to the Rivett Lathe & Grinder, Inc., Brighton, Boston, Mass.

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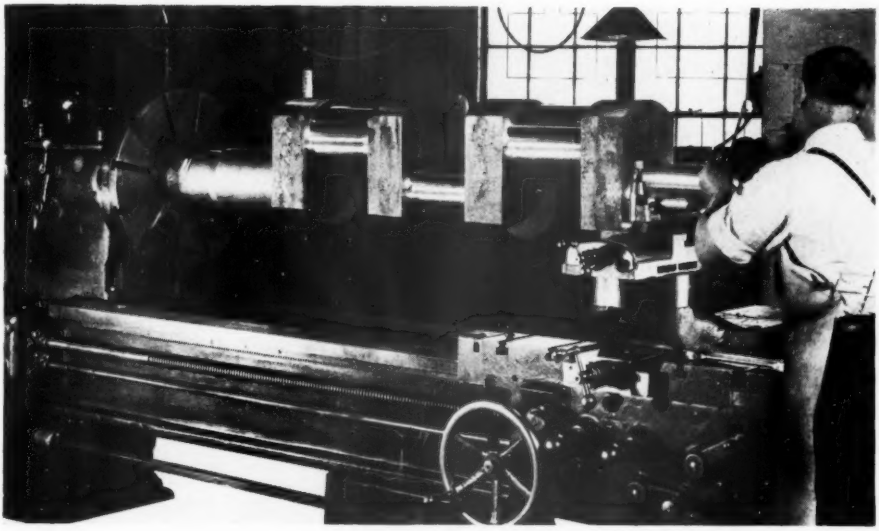
When you order or write about products described in TDM PROGRESS please mention the publication.

Emergency Service on EMPCO Crankshafts



A double-throw Empco Crankshaft being machined on one of our lathes —weight, 2 tons; length, 110″; pin diameter, 10″; throw, 6″. Delivery 10 days after making of forging; total time, 2 weeks. Smaller crankshafts needed in emergencies, delivery one week.

A power press breakdown is a serious matter for most stamping plants. Delay in getting a press back into service is costly and can have far-reaching production results. Every day counts and we know how to "reduce" the days of machine idleness. Our facilities have been developed to meet the urgency of your needs. Our prices will show noteworthy savings over those of other supply sources. Let us prove it.

Empco Crankshaft Steel

Here is a steel that takes punishment standing up. It is alloyed of the purest base metals, melted, poured and forged under expert supervision, to achieve the highest physical properties. Scientific heat treatment brings out all the rugged qualities of this fine steel.

Forgings of EMPCO Crankshaft Steel normalize at 1650° with a Brinell hardness of 228-241 and have a tensile strength of 110,000. EMPCO Crankshafts are heated to 1550°, quenched and drawn to 900°, attaining a Brinell hardness of 269 to 300 and a tensile strength of 145,000 to 165,000 lbs. per square inch.

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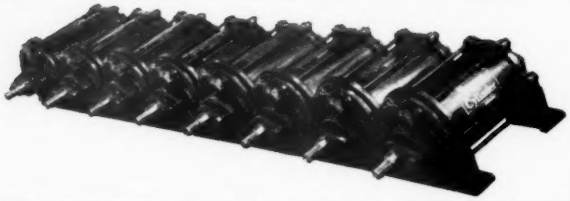
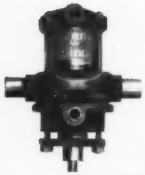


HANNA Cylinders may be mounted vertically, horizontally or in any other position and deliver the same powerful, smooth, positive thrust or pull motion.

Select an operation in your plant involving a pushing, pulling, lifting or lowering motion and compare cost of doing it with a Hanna Cylinder.



TO LEARN PRICE OF CYLINDER SPECIFY FOLLOWING:
1. Cylinder diameter or force required.
2. Length of stroke. 3. How cylinder is to be mounted.

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